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F2G G37

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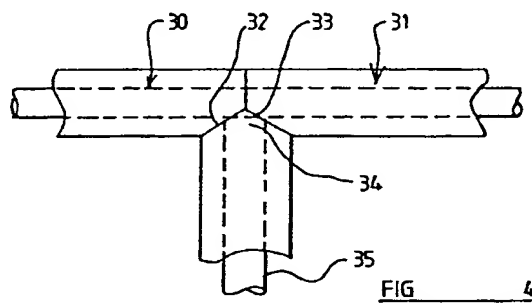
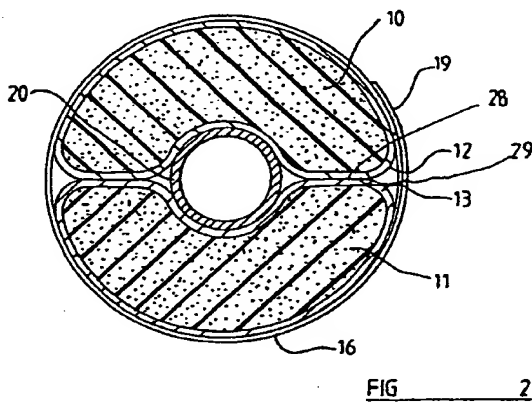
(58) Field of Search

UK CL (Edition M ) F2G G37 , F2P PC26 PC27 PC29

INT CL<sup>5</sup> F16L 59/00

## (54) Improvements in or relating to insulation means

(57) Insulation means primarily for pipework for carrying gasses or fluids at high temperatures in excess of 120°C comprises pre-formed pre-covered pieces of insulation material 10, 11 which can be applied to pipework or removed therefrom without exposing the insulation material itself to the atmosphere. An outer covering layer 16 may be provided to enhance insulation properties and to provide an outer surface acceptable in an hygienic area such as one where food is prepared. The insulation material 10, 11 may comprise rock fibre, glass fibre, calcium silicate, foam or magnesium silicate. The covering layer 16 may comprise a reinforced plastics material and a silicone rubber material.



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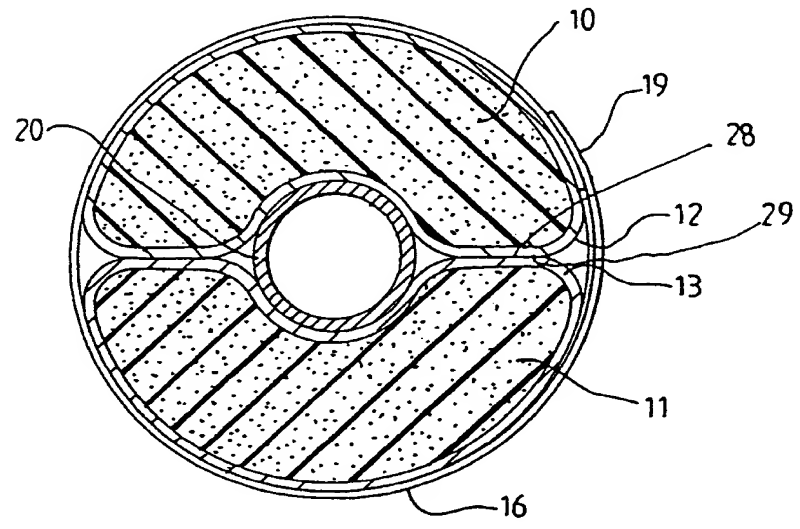
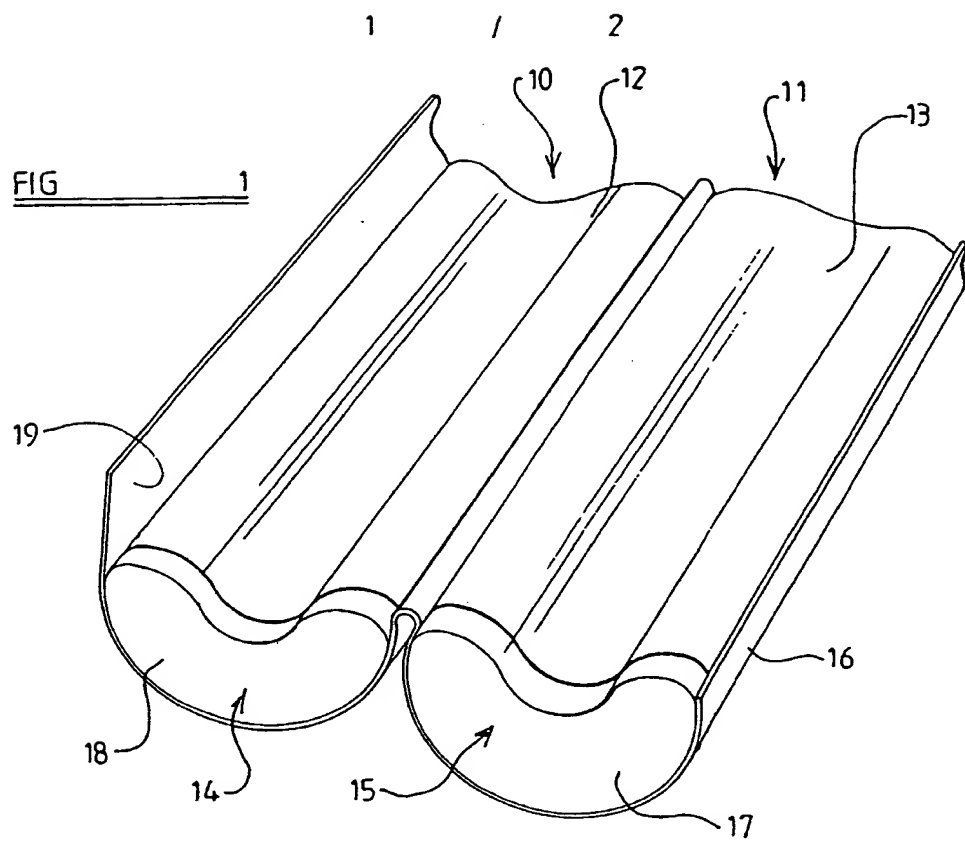


FIG 2

2 1 2

FIG 3

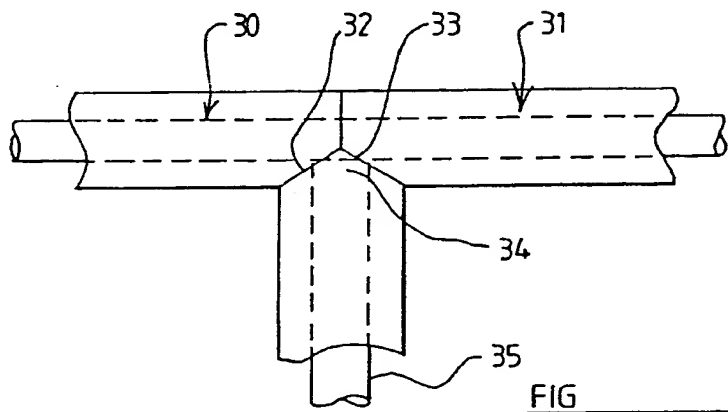
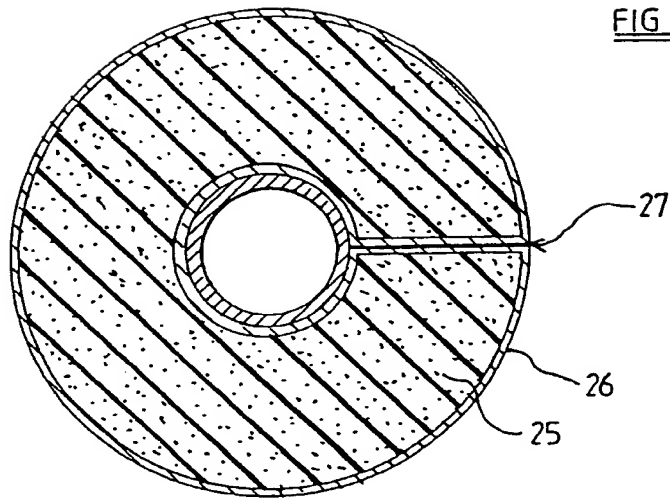
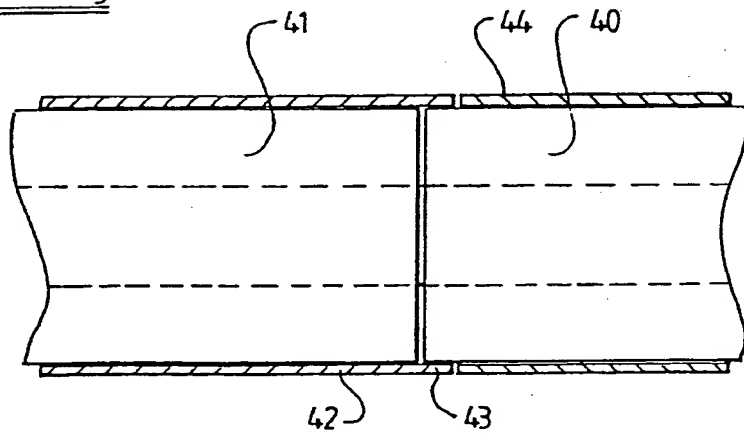


FIG 4

FIG 5



**Title: "Improvements in or relating to Insulation Means"**

**Description of Invention**

This invention relates to insulation means and is primarily concerned with providing insulation against heat loss, it is also envisaged however that the insulation means may be equally suitable to prevent access of heat to pipes carrying refrigerant for example.

The invention is also primarily concerned with insulation means for use in a clean environment whether the clean environment is required for health or technical reasons. One example would be rooms where food is made, prepared or packed.

Different types of insulating means are known and for pipe lagging it is known to use moulded foam, glass or other mineral fibre and, where temperatures in the pipes are likely to exceed 100°C-120°C then calcium silicate is often used and it has also been known to use magnesium silicate. Calcium silicate is usually moulded in sections whereby two sections may be applied around a pipe to be insulated so that the pipe is enclosed by calcium silicate.

Unfortunately, the calcium silicate is friable and it is therefore necessary, once it has been placed in position on a pipe to be insulated, for it to be subsequently bound in scrim followed by the application of a plaster layer and subsequently painted or otherwise covered in a substance that effectively seals the calcium silicate from the clean environment. If mineral fibre is used, it must also be covered to maintain a clean environment.

Where a clean environment requires the presence of steam or "product" pipes i.e. pipes with high temperature products in liquid or gaseous form or solids carried by high temperature liquids or gasses with temperatures in excess of 120°C, the above described manner of lagging pipes has been almost universally adopted.

Whereas a pipe lagged in the above manner is well insulated, the installation is extremely messy and, if it is required to subsequently make a

change to the pipework, which is quite frequent where steam or very hot water is used in food processing, because it is necessary to cut through the protective layer of plaster and into the insulation material, it is often essential to clear the entire room because of health reasons, remove the lagging, carry out modifications on the pipework and subsequently clean the room before it can be put back into use, which is an extensive and time consuming operation.

The room may also have to be similarly evacuated if, for example, one of the lagged pipes develops a leak.

It is an object of the present invention to provide a lagging means that overcomes or minimises the problems mentioned above.

According to one aspect of the present invention, we provide insulation means adapted for the thermal insulation of pipes, said insulation means comprising a piece of thermally insulating material shaped in a manner such that either alone or in combination with another piece or other pieces of insulation material, a pipe may be surrounded thereby and wherein the or each piece of insulation material is wrapped or otherwise coated or a plurality of pieces are collectively wrapped or otherwise coated with a resilient material in a manner such that said insulation material is wholly enclosed by said resilient material.

Preferably said insulating means comprises two pieces of insulating material, each covered in said resilient material, each piece of material being adapted to surround half of a pipe to be insulated and conveniently said two pieces of material may be secured to an outer layer of covering material, said outer layer extending around the outer circumference of said pieces of insulating material and conveniently may be of a length greater than the circumference to enable an overlap by means of which overlap in combination with fastening means or adhesive, said outer covering layer may secure the pieces of insulating material to a pipe to be insulated and further seal the insulation from the environment.

In the case where a radial joint is provided, two abutting surfaces of said wrapped or otherwise coated insulation material may be joined by adhesive sealant or other means to secure the insulation means to the pipe.

It is envisaged that the insulation means will be made of different lengths so that one length may be abutted against another, the manufacture of the insulating means in different lengths enabling a combination of pieces to be used to properly insulate a pipe from one end to the other.

Conveniently, where an outer covering material is provided, the covering material may extend beyond the length of the piece or pieces of insulating material thereby allowing an overlap of the covering material so that juxtaposed lengths of insulating material may be "connected" end-to-end to each other.

Preferably the insulating material, which may be calcium silicate, glass fibre, other mineral fibre, foamed plastics, or any other suitable insulation material, is coated with a silicone based material and conveniently may be wrapped in a plastics coated reinforced cloth, in particular a reinforced silicone material has been found to be very suitable, this provides a tough and resilient coating enabling the insulation material to take fairly severe knocks without the covering material being punctured. This is very important in an environment where it is essential that the calcium silicate or other insulating material is kept out of the atmosphere.

The insulating material may be covered by any suitable means and when wrapped in plastics coated reinforced cloth, the ends of the pieces of individual insulating material may be sprayed or dipped in sealant, for example a silicone based material to ensure that the piece of insulating material is fully sealed in a resilient coating.

The pieces of insulating material may be found in a plurality of different lengths and may also be shaped to accommodate different pipe sizes and may come in different thicknesses depending upon the insulating properties required.

It is also envisaged that special shapes may be made to accommodate points, valves and other fittings commonly used in pipework whereby a plurality of pre-formed parts may be used to provide a complete insulation for pipework and associated fittings.

The outer covering sheet may comprise a silicone rubber which provides a smooth outer surface which is easy to clean, is fairly flexible and also very

resilient thus providing a further safeguard against possible damage to the insulating material.

The insulation means of the present invention provides considerable advantages in that it is very much quicker to install than existing insulation systems being fully enclosed it is hygienic, waterproof and can be assembled around pipework without causing dust. A further advantage is that if alteration to the pipework is necessary, it can easily be removed and if, for example, the pipework develops a leak it is a very simple task to remove the insulation to find the position of the leak, carry out repair to the pipe whereafter the insulation may be replaced, none of which allows any calcium silicate or other insulating material which may be hazardous to enter a clean environment.

The invention will now be described in more detail by way of example only with reference to the accompanying drawings, wherein:

FIGURE 1 is a perspective view of one embodiment of insulating means;

FIGURE 2 is a sectional view of the insulation means shown in Figure 1 in position on a pipe;

FIGURE 3 is a section through an alternative embodiment of insulation means;

FIGURE 4 is a diagrammatic view of insulation means on pipework;

FIGURE 5 illustrates the overlap in the outer covering layer.

Referring first to Figures 1 and 2, a length of insulation means is shown, the insulation means comprises two pieces 10 and 11 of pre-formed insulating material such as calcium silicate, each of which are first wrapped in a layer 12 and 13 of reinforced plastics material which may be a silicone coated glass fibre cloth which may be secured by adhesive or any other suitable means to the sections of calcium silicate.

The ends of the two pieces of insulation material can either also be wrapped in the silicone coated glass fibre cloth or alternatively, as shown in the drawings may be coated with a silicone by dipping, spraying or any other suitable means which has the effect of not only sealing the end of the piece of insulation

material but also acts as a secure bond to prevent any separation of the covering cloth 12 and 13 from the insulation material 10 and 11.

It will be appreciated that the other ends are sealed in a similar manner so that the pieces of calcium silicate 10 and 11 are fully enclosed so that it is sealed from the environment in which it is to be used.

As an alternative to the calcium silicate, any suitable insulation material may be used and may comprise a plastics foam, a fibre glass or other mineral wool depending upon the use to which the insulation means is to be put and the temperatures to which it is likely to be subjected.

Wrapped around the two pieces of covered insulating material 10 and 11 is an outer covering sheet which can be made from any suitable material depending upon the use to which the insulation means is to be put and the environment in which it is present, but once again may comprise a silicone sheet and the sheet may be secured to the pieces of insulation material, or at least their covering sheets, by any suitable means and in the case where the ends 14 and 15 are sealed by the application of a silicone sealant 17 and 18, the cover sheet 16 may be placed in position before the sealant has dried, hence securing the sheet 16 in position.

The silicone sheet 16 is longer than the circumference of the two pieces of insulating material thus leaving a flap 19. In use of the insulation means, the two pieces of material held by the outer covering sheet 16 are placed in position around a pipe and the flap 19 may then be sealed by adhesive or any other suitable means as shown in Figure 2 so that the insulation means is firmly secured to the pipe 20.

Referring now to Figure 3, an alternative embodiment is shown in which a piece of insulating material 25, which in this case must have some flexibility, for example fibre glass or mineral wool or a flexible foamed plastics, is provided with a covering layer 26 of any suitable material and, as shown in the embodiments 1 and 2, may comprises a silicone coated glass fibre cloth which is both resilient and flexible. The ends (not shown) of the piece of insulation material may be sealed either by the covering cloth 26 or alternatively by dipping, spraying or otherwise



being coated with a resilient sealing compound such as silicone in a manner similar to that described with the embodiments shown in Figures 1 and 2.

As an alternative to the covering by sheet material, it is envisaged that after pre-shaping the piece of insulation material 25 it may be given a sealing coating by spraying, dipping, painting or any other satisfactory method.

The piece of insulation material is shown as a single piece, however a discontinuity 27 is provided to which in view of the flexibility of the insulating material may be opened to allow the piece of insulation to be placed around the pipe and, depending upon the environment in which the insulation is to be used, there may be once again an outer covering layer, such as that shown at 16 on the embodiment shown in Figures 1 and 2. Once again a flap can be provided to further secure the insulation around a pipe.

Alternatively a sealant such as a silicone sealant may be applied to the abutting surfaces 28 and 29.

Figure 4 illustrates how the end portions of pieces of insulation material may be specially shaped to accommodate joints in pipework.

In this case one end of two pieces of insulation material 30 and 31 are each formed with identical cut-outs 32 and 33 so as to permit a "bevelled" nose portion 34 of a further piece of insulation material 35 to make good contact with the other piece of insulation material so as not to permit any gaps and hence providing a breakdown in the insulation provided by the insulation means.

It will be appreciated that any other specially formed features may easily be provided and the system of sealing the insulation material, particularly with a liquid silicone on the end portions, easily lends itself to the production of special "one-off" pieces to accommodate particular features of the pipework.

Referring now to Figure 5, two pieces of insulation material 40 and 41 are shown each being covered with a covering material in the normal manner as above described, the outer covering layer 42 provided on the piece of material 41 extends in an end portion 43 beyond the insulation material 41, the covering material 44 provided on the insulation material 40 does not extend right up to the end of the insulation material thus allowing the end portion 43 of covering

material 42 to overlap the insulation material 40 so that the join in the covering materials is longitudinally displaced from the join of the insulation materials.

This displacement of the joint not only enhances the thermal insulation provided by the insulation means but also is of considerable assistance when installing the insulation in that one section is tied to the next.

As an alternative it is envisaged that whereas the overlapping end part 43 can always be provided on one end of each piece of insulation material, at the other non-overlapping end it will still extend right up to the end of the piece of insulation material and in this case the overlapping end 43 will merely be wrapped around a small part of the covering material of an adjacent piece of insulation material.

It will be appreciated that the above described embodiments are merely examples of the many forms and shapes which the insulation means of the present invention can take.

The features disclosed in the foregoing description, or the accompanying drawings, expressed in their specific forms or in the terms or means for performing the desired function, or a method or process for attaining the disclosed result, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

## CLAIMS:

1. Insulation means adapted for the thermal insulation of pipes, said insulation means comprising a piece of thermally insulating material shaped in a manner such that either alone or in combination with another piece or other pieces of insulation material, a pipe may be surrounded thereby and wherein the or each piece of insulation material is wrapped or otherwise coated or a plurality of pieces are collectively wrapped or otherwise coated with a resilient material in a manner such that said insulation material is wholly enclosed by said resilient material.
2. Insulation means according to Claim 1 wherein said insulation material comprises a fibrous material.
3. Insulation means according to Claim 2 wherein said insulation material comprises rock fibre.
4. Insulation means according to Claim 2 wherein said insulation material comprises glass fibre.
5. Insulation means according to Claim 1 wherein said insulation material comprises calcium silicate.
6. Insulation means according to Claim 1 wherein said insulation material comprises magnesium silicate.
7. Insulation means according to any one of the preceding claims and comprises two pieces of insulation material each covered in said resilient material, each piece of material being adapted to surround approximately half of a pipe to be insulated.

8. Insulation means according to any one of the preceding claims wherein the insulation means is given an outer layer of covering material.

9. Insulation means according to Claim 8 wherein said outer layer comprises a silicone rubber material.

10. Insulation means according to any one of the preceding claims wherein the or each piece of insulation material is wrapped or otherwise coated with a reinforced plastics material.

11. Insulation means according to Claim 10 wherein said reinforced plastics material comprises a reinforced silicone based material.

12. Insulation means according to Claim 8 wherein said outer covering layer has a length greater than the circumference of the insulation means to enable an overlap by means of which overlap in combination with fastening means or adhesive said outer covering layer may secure the pieces of insulating material to a pipe to be insulated.

13. Insulation means according to Claim 8 wherein said outer covering layer extends beyond the piece or pieces of insulating material thereby allowing an overlap of the outer covering material so that juxtaposed lengths of insulating material may be connected end-to-end to each other.

14. Insulation means according to Claim 1 wherein said insulating material comprises a foamed plastics material.

15. Insulation means according to any one of the preceding claims wherein said insulation material is covered by dipping or spraying with a covering material.

16. Insulation means substantially as hereinbefore described with reference to and as illustrated in Figures 1 and 2 of the accompanying drawings.

17. Insulation means substantially as hereinbefore described with reference to and as illustrated in Figure 3 of the accompanying drawings.

18. Insulation means including any novel feature or novel combination of features disclosed herein and/or illustrated in the accompanying drawings.

**Relevant Technical Fields**

- (i) UK Cl (Ed.M) F2P (PC27, PC26, PC29); F2G (G37)  
(ii) Int Cl (Ed.5) F16L 59/00

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner  
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Date of completion of Search  
7 JANUARY 1994

Documents considered relevant  
following a search in respect of  
Claims :-  
1-17

**Categories of documents**

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A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1306832	(WAVIN) eg. Figure 2 and page 2 lines 83-95	1,8,10,14
X	GB 1181672	(BAXENDEN) eg. page 1 lines 76-77	1, 14
X	GB 1156550	(UNION CARBIDE) eg. page 2 line 49	1,2,4,5,8 10,14
X	GB 638306	(RAYBESTOS-MANHATTAN) eg. page 3 line 104	1,2,3,4,8
X	GB 281490	(GOSSLER) eg. page 1 line 62	1, 4

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).